Mach Effect Thruster: Theory and Experiment

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This is an outline of the theory underlying Mach effects and their use for propulsion. We define the basic principles of the theory and then discuss the experimental setup and results, which agree with the theory to within an order of magnitude. Beginning with the ideas of Sciama in 1953, in his paper "On the Origins of Inertia" we show how gravity does indeed account for inertial reaction forces. Two conditions must be satisfied, first $\Phi/c^2=1$ must be true everywhere and second the simple vector approximation of Sciama must be applicable in cases where a more elaborate formalism of General Relativity theory (not just flat space-time) is employed (for example rotating systems, Friedmann-Walker metric). That $\Phi/c^2=1$ was shown to be true by Carl Brans in 1962. This is guaranteed by the locally measured invariance of Φ, the "non-localizability" of gravitational potential energy provision of the Einstein Equivalence principle. It also follows from the spatial flatness seen from the Wilkinson Microwave Anisotropy probe WMAP data. As for the second condition, Nordtvedt showed in 1988 that "gravitomagnetism" must be taken into account to properly account for frame dragging in rotational systems, he also found Sciama was off by a factor of 4. Sultana and Kazanas have shown that when the Friedmann-Walker metric is used along with the Sciama vector approach and realistic values of the cosmological parameters, that one obtains $\Phi/c^2=0.23$ instead of 1. However, if we take into account the multiplicative factor of 4 found by Nordvedt, then $\Phi/c^2= 0.92$ or equivalently F = 0.92ma in the paper, which is well within the errors of the cosmological parameters on a universal scale.

The transient terms we employ for the Mach Thruster are derivable from a 4-force, which gives a field strength when divided by rest mass. Taking the divergence of the field strength allows us to derive a wave equation with transient time terms. It is these transient time terms which allow for mass fluctuations in accelerating bodies which are simultaneously undergoing internal energy changes. We will show experimental apparatus to demonstrate the Mach effects and experimental results to show thrust whose levels are well above noise, with signal to noise ratio SNR of about 45 or more.